

Status of and Amendments to Claims

1. (currently amended): A method of transferring metals and/or amines from a hydrocarbon phase to a water phase in a refinery desalting process comprising:
 - adding to a wash water, an effective amount of a composition to transfer metals and/or amines from a hydrocarbon phase to a water phase comprising at least one water-soluble hydroxyacid selected from the group consisting of glycolic acid, gluconic acid, C₂-C₄ alpha-hydroxy acids, poly-hydroxy carboxylic acids, thioglycolic acid, chloroacetic acid, polymeric forms of the above hydroxyacids, poly-glycolic esters, glycolate ethers, and ammonium salt and alkali metal salts of these hydroxyacids, and mixtures thereof;
 - lowering the pH of the wash water to 6 or below, before, during and/or after adding the composition;
 - adding the wash water to crude oil to create an emulsion; and
 - resolving the emulsion into hydrocarbon phase and an aqueous phase using electrostatic coalescence, where at least a portion of the metals and/or amines are transferred to the aqueous phase.
2. (original): The method of claim 1 where in the adding of the composition, the composition additionally comprises a mineral acid.
3. (original): The method of claim 2 where in the adding of the composition, the composition further comprises
 - down to about 1 wt.% water-soluble hydroxyacid; and
 - up to about 20 wt.% mineral acid.
4. (previously presented): The method of claim 2 where the amount of mineral acid is sufficient to lower the pH of the wash water to 6 or below.

5. (original): The method of claim 1 where in the adding of the composition, the water-soluble hydroxyacid is present in the emulsion in an amount ranging from about 1 to about 2000 ppm.

6. (original): The method of claim 1 where in the adding of the composition, the composition further comprises water or alcohol solvent.

7. (currently amended): A method of transferring metals and/or amines from a hydrocarbon phase to a water phase in a refinery desalting process comprising:
adding to a wash water, an effective amount of a composition to transfer metals and/or amines from a hydrocarbon phase to a water phase comprising at least one water-soluble hydroxyacid selected from the group consisting of glycolic acid, gluconic acid, C₂-C₄ alpha-hydroxy acids, poly-hydroxy carboxylic acids, thioglycolic acid, chloroacetic acid, polymeric forms of the above hydroxyacids, poly-glycolic esters, glycolate ethers, and ammonium salt and alkali metal salts of these hydroxyacids, and mixtures thereof, where the water-soluble hydroxyacid comprises from about 1 to about 100 wt.% of the composition and the composition further comprises a water or alcohol solvent;

lowering the pH of the wash water to 6 or below, before, during and/or after adding the composition;

adding the wash water to crude oil to create an emulsion; and
resolving the emulsion into hydrocarbon phase and an aqueous phase using electrostatic coalescence, where at least a portion of the metals and/or amines are transferred to the aqueous phase.

8. (previously presented): The method of claim 7 where the amount of mineral acid is sufficient to lower the pH of the wash water to 6 or below.

9. (currently amended): A composition for transferring metals and/or amines from a hydrocarbon phase to a water phase comprising:

water;

a water-soluble hydroxyacid selected from the group consisting of glycolic acid, gluconic acid, C₂-C₄ alpha-hydroxy acids, poly-hydroxy carboxylic acids, thioglycolic acid, chloroacetic acid, polymeric forms of the above hydroxyacids, poly-glycolic esters, glycolate ethers, and ammonium salt and alkali metal salts of these hydroxyacids, and mixtures thereof; and

a mineral acid,

where the pH of the composition is 6 or below.

10. (original): The composition of claim 9 where the composition additionally comprises at least one additional component selected from the group consisting of a water or alcohol solvent, a corrosion inhibitor, a demulsifier, a scale inhibitor, metal chelants, wetting agents and mixtures thereof.

11. (original): The composition of claim 9 where the composition further comprises:

down to about 1 wt.% water-soluble hydroxyacid; and

up to about 20 wt.% mineral acid.

12. (currently amended): A composition for transferring metals and/or amines from a hydrocarbon phase to a water phase comprising:

water;

a water-soluble hydroxyacid selected from the group consisting of glycolic acid, gluconic acid, C₂-C₄ alpha-hydroxy acids, poly-hydroxy carboxylic acids, thioglycolic acid, chloroacetic acid, polymeric forms of the above hydroxyacids, poly-glycolic esters, glycolate ethers, and ammonium salt and alkali metal salts of these hydroxyacids, and mixtures thereof; and

at least one additional component selected from the group consisting of a water or alcohol solvent, a corrosion inhibitor, a demulsifier, a scale inhibitor, metal chelants, wetting agents and mixtures thereof, where the pH of the composition is 6 or below.

13. (original): The composition of claim 12 where the water-soluble hydroxyacid comprises from about 1 to about 85 wt% of the composition.

14. (currently amended): A treated hydrocarbon crude oil emulsion comprising:
crude oil;
water; and
a composition for transferring metals and/or amines from a hydrocarbon phase to a water phase comprising a water-soluble hydroxyacid selected from the group consisting of glycolic acid, gluconic acid, C₂-C₄ alpha-hydroxy acids, poly-hydroxy carboxylic acids, thioglycolic acid, chloroacetic acid, polymeric forms of the above hydroxyacids, poly-glycolic esters, glycolate ethers, and ammonium salt and alkali metal salts of these hydroxyacids, and mixtures thereof; and wash water where the pH of the wash water is 6 or below.

15. (previously presented): The treated crude oil emulsion of claim 14 where the composition further comprises a mineral acid.

16. (previously presented): The treated crude oil emulsion of claim 15 where the composition further comprises:
down to about 1 wt.% water-soluble hydroxyacid; and
up to about 20 wt.% mineral acid.

17. (currently amended): The treated crude oil emulsion of claim 15 ~~further comprising wash water and~~ where the amount of mineral acid is sufficient to lower the pH of the wash water to 6 or below.

18. (previously presented): The treated crude oil emulsion of claim 14 where the water-soluble hydroxyacid is present in the emulsion in an amount ranging from about 1 to about 2000 ppm.

19. (previously presented): The treated crude oil emulsion of claim 14 where the composition further comprises at least one additional component selected from the group consisting of a water or alcohol solvent, a corrosion inhibitor, a demulsifier, a scale inhibitor, metal chelants, wetting agents and mixtures thereof.

20. (previously presented): The treated crude oil emulsion of claim 14 where the hydrocarbon component contains more than 10 ppm iron or calcium.

21. (previously presented): The method of claim 1 where the composition additionally comprises at least one additional component selected from the group consisting of a water or alcohol solvent, a corrosion inhibitor, a demulsifier, a scale inhibitor, metal chelants, wetting agents and mixtures thereof.

22. (currently amended): A method of transferring amines from a hydrocarbon phase to a water phase in a refinery desalting process comprising:

adding to a wash water, an effective amount of a composition to transfer amines from a hydrocarbon phase to a water phase comprising at least one water-soluble organic acid selected from the group consisting of glycolic acid, gluconic acid, citric acid, C₂-C₄ alpha-hydroxy acids, poly-hydroxy carboxylic acids, thioglycolic acid, chloroacetic acid, polymeric forms of the above hydroxyacids, poly-glycolic esters, glycolate ethers, and ammonium salt and alkali metal salts of these hydroxyacids, and mixtures thereof;

lowering the pH of the wash water to 6 or below, before, during or after adding the composition;

adding the wash water to crude oil to create an emulsion; and

resolving the emulsion into hydrocarbon phase and an aqueous phase using electrostatic coalescence, where at least a portion of the metals and/or amines are transferred to the aqueous phase.

23. (previously presented): The method of claim 22 where in the adding of the composition, the composition additionally comprises a mineral acid.

24. (previously presented): The method of claim 22 where the composition additionally comprises at least one additional component selected from the group consisting of a water or alcohol solvent, a corrosion inhibitor, a demulsifier, a scale inhibitor, metal chelants, wetting agents and mixtures thereof.

25. (currently amended): A method of transferring metals and/or amines from a hydrocarbon phase to a water phase in a refinery desalting process comprising:

adding to a wash water, an effective amount of a composition to transfer metals and/or amines from a hydrocarbon phase to a water phase comprising a mineral acid and at least one water-soluble organic acid selected from the group consisting of glycolic acid, gluconic acid, citric acid, C₂-C₄ alpha-hydroxy acids, poly-hydroxy carboxylic acids, thioglycolic acid, chloroacetic acid, polymeric forms of the above hydroxyacids, poly-glycolic esters, glycolate ethers, and ammonium salt and alkali metal salts of these hydroxyacids, and mixtures thereof;

lowering the pH of the wash water to 6 or below, before, during and/or after adding the composition;

adding the wash water to crude oil to create an emulsion; and resolving the emulsion into hydrocarbon phase and an aqueous phase using electrostatic coalescence, where at least a portion of the metals and/or amines are transferred to the aqueous phase.

26. (previously presented): The method of claim 25 where the composition additionally comprises at least one additional component selected from the group consisting of a water or alcohol solvent, a corrosion inhibitor, a demulsifier, a scale inhibitor, metal chelants, wetting agents and mixtures thereof.

27. (currently amended): A composition for transferring metals and/or amines from a hydrocarbon phase to a water phase comprising:

water;

a water-soluble organic acid selected from the group consisting of glycolic acid, gluconic acid, citric acid, C₂-C₄ alpha-hydroxy acids, poly-hydroxy carboxylic acids, thioglycolic acid, chloroacetic acid, polymeric forms of the above hydroxyacids, poly-glycolic esters, glycolate ethers, and ammonium salt and alkali metal salts of these hydroxyacids, and mixtures thereof; and

a mineral acid,

where the pH of the composition is 6 or below.

28. (previously presented): The composition of claim 27 where the composition additionally comprises at least one additional component selected from the group consisting of a water or alcohol solvent, a corrosion inhibitor, a demulsifier, a scale inhibitor, metal chelants, wetting agents and mixtures thereof.

29. (currently amended): A treated crude oil emulsion comprising:

crude oil;

water; and

a composition for transferring amines from a hydrocarbon phase to a water phase comprising a water-soluble organic acid selected from the group consisting of glycolic acid, gluconic acid, citric acid, C₂-C₄ alpha-hydroxy acids, poly-hydroxy carboxylic acids, thioglycolic acid, chloroacetic acid, polymeric forms of the above hydroxyacids, poly-

glycolic esters, glycolate ethers, and ammonium salt and alkali metal salts of these hydroxyacids, and mixtures thereof; and wash water where the pH of the wash water is 6 or below.

30. (previously presented): The treated crude oil emulsion of claim 29 where the composition further comprises a mineral acid.

31. (previously presented): The treated crude oil emulsion of claim 29 where the composition further comprises at least one additional component selected from the group consisting of a water or alcohol solvent, a corrosion inhibitor, a demulsifier, a scale inhibitor, metal chelants, wetting agents and mixtures thereof.

32. (currently amended): A treated crude oil emulsion comprising:

crude oil;

water; and

a composition for transferring metals and/or amines from a hydrocarbon phase to a water phase comprising a mineral acid and a water-soluble organic acid selected from the group consisting of glycolic acid, gluconic acid, citric acid, C₂-C₄ alpha-hydroxy acids, polyhydroxy carboxylic acids, thioglycolic acid, chloroacetic acid, polymeric forms of the above hydroxyacids, poly-glycolic esters, glycolate ethers, and ammonium salt and alkali metal salts of these hydroxyacids, and mixtures thereof; and wash water where the pH of the wash water is 6 or below.

33. (previously presented): The treated crude oil emulsion of claim 32 where the composition further comprises at least one additional component selected from the group consisting of a water or alcohol solvent, a corrosion inhibitor, a demulsifier, a scale inhibitor, metal chelants, wetting agents and mixtures thereof.